

# Water Supply

## *Wyoming Science, Social Studies*

### Objectives:

- Students learn that water exists as a liquid, solid, and a gas.
- Students learn about the water cycle and how one form of water changes into another form.
- Students learn where water is located on Earth.
- Students learn that each water location contains different forms of water and what type of water is available for us to use.

### Background:

One of the most important natural resources that covers the earth's surface is water. All living things depend on water for survival. As the world population continues to grow, more and more people, plants, animals, and other living creatures need water to live. Water is a renewable resource because it can be used over and over through evaporation, transpiration, and precipitation. The water that is on earth now is the same water that has always been here. No "new water is being made."

The movement of water in and around the earth is called the water cycle. The water cycle is a continuous cycle. Rain or snow falls on oceans and land as precipitation. The soil will soak up some of the water. Plants will take up some of this water through their roots and some water will move down through the soil and become groundwater. Some of the water from the rain and snow will run off the land into streams, marshes, lakes, and oceans. The water that remains on the earth's surface is called surface water. The surface water will return to the atmosphere through evaporation. Then water vapor may form clouds that cause precipitation-rain or snow-to occur again. The precipitation will return to the surface of the earth and the cycle will continue.

Water is extremely important for crop production because crops (plants) need water to grow. A good crop of corn or wheat in Wyoming need at least (20 inches ) of water a year. Yet, almost every year, the corn and wheat is limited to some degree by drought. Drought is when there is a lack of water. Some years the summer rainfall is below normal and some years there are varying amounts of rainfall throughout the season. Due to these situations, more and more farmer are installing irrigation systems to ensure that their crops receive an adequate amount of water.

Irrigation is watering land with artificial methods, or man made watering. Water is taken from lakes, rivers,



## Standards

### Science

Earth Space  
& Physical Systems:  
1.4, 1.5, 1.8

Science As Inquiry:  
2.1, 2.2D, 2.2E

### Social Studies

People, Places, & Environments:  
5.1, 5.2, 5.4

## Materials

- Ice cubes
- Water
- Large, clear plastic bowls
- Clear glass
- Masking tape
- Small container (like a butter tub)
- Small weight (like a rock w/a diameter the size of a quarter)
- Clear plastic wrap
- Large rubber band
- 1 gallon container (such as a plastic ice cream bucket)
- Clear bowl
- Eye dropper
- ½ cup measuring cup
- Small plate

## Estimated Time

90 Minutes

## Grades 3-4

## *notes:*

streams, and wells, transported to croplands, and used to water the crops. Irrigation is used in areas that go without rainfall for a long time. Places such as the Southwest U.S., Egypt and Italy use irrigation during dry periods.

### **Activity Procedures:**

#### ***Activity 1: Changing State***

1. Place one cup of water into a clear bowl. Place a piece of masking tape on the outside of the bowl at the top of the water line. Set the bowl on a sunny window sill. Check the bowl every half-hour to see what happens. The sun will warm the water and cause the water to evaporate. This means that the water will turn from a liquid into a gas (water vapor). The amount of water in the bowl will decrease when the liquid turns into water vapor. (Remind students that we cannot see water vapor).
2. After you place the bowl of water in the window sill, fill a clear glass three-fourths full with ice. Set the glass of ice where most students can watch it. Check the glass every 15 to 20 minutes to see what happens. Explain to your students that ice is the solid state of water. Ice will melt because the classroom is not at a cold enough temperature to keep the ice frozen. The melting ice demonstrates the change of a solid to a liquid.
3. Explain to the students that liquid water can be changed into its solid state – ice. This happened when their parents fill ice cube trays with water and put the trays in the freezer. The extremely cold temperature in the freezer changes the liquid water into ice, which is solid.

#### ***Activity 2: Water Cycle***

1. Explain to the students that water changes from one form into another naturally in the environment. To help your students understand how water changes from one form to another in nature, make a water cycle using the following directions.
2. Take the clear plastic bowl and place the smaller container (butter tub) in the middle of the large bowl. Pour water into the large bowl, around the small container, but not inside the small container. Fill the large bowl until the water level reaches to about three-fourths of the height of the small container.
3. Place a piece of clear plastic wrap over the large bowl. Put the rubber band around the top of the bowl to keep the plastic wrap in place. Take the weight (rock) and put it in the middle of the plastic wrap. Place the “water cycle” inside the classroom in a sunny spot (like a window sill).

- The sun will heat the water in the large bowl so the water will evaporate, just like the water did in the previous experiment. Here the liquid form of water has changed into gas. The evaporated water (gas) will rise and condense on the plastic wrap. This means that the water vapor has turned back into liquid. The water droplets will slide down the plastic wrap until they are underneath the weight (rock). Then they will fall into the small container. The small container collects the water that has been “recycled.”

### **Activity 3: The Earth’s Water Supply**

- Discuss the Earth’s water supply using the information from the introduction.
- Display the following chart on a poster of the chalkboard.  
INSERT CHART
- To determine how much of the earth’s water is actually used, ask some students to help you with the following activity. (Make the student understand this is just a demonstration and there is actually more water than this on Earth)
- Pour water into a one-gallon container, such as a plastic ice cream bucket. This represents all the water on the earth.
- Pour a half-cup of water out of the one-gallon container and into a clear bowl. The water in the bowl represents all of the fresh water on earth, with is less than three percent of the total water on earth. Fresh water is found in lakes, rivers, groundwater, ice and living things. The 15 half cups that are still in the one-gallon container represents salt water. We cannot use salt water.
- With an eyedropper, drop on drop of water from the half-cup onto a small plate. This one drop represents the fresh-water that is available for our use. This water is found in rivers and lakes. The rest of the water in the half-cup is deep groundwater, water bound up as soil moisture, biomass water or water in the atmosphere.

### **Questions for Investigation & Assessment:**

- In what forms does water exist?
- Can one form of water change into a different form?
- How can water change from a liquid into a gas (water vapor)?
- How does ice (a solid) change into water (a liquid)?
- How does a liquid (water) change into a solid (ice)?
- What is the water cycle?
- Why can’t we use the water available in the oceans?
- What types of water can we use?
- Where is the water found that we can use?
- Can you think of ways that we can conserve water?

### ***vocabulary:***

- natural resource*
- renewable resource*
- evaporation*
- transpiration*
- precipitation*
- irrigation*

# Earth's Water Supply

Oceans	97.3%
Ice	2.19%
Groundwater	0.5%
Soil Moisture	0.005%
Atmosphere	0.001%
Inland Lakes	0.018%
Rivers	0.000096%

